CONFERENCE ON DISARMAMENT

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AUSTRALIA AND NEW ZEALAND

VERIFICATION OF A COMPREHENSIVE TEST BAN

Summary

New Zealand and Australia share a common commitment to the achievement of a comprehensive ban on nuclear testing. The resolution submitted jointly by Australia and New Zealand to last year's General Assembly emphasises that:

> "An end to nuclear testing by all states in all environments for all time is an essential step in order to prevent the qualitative improvement and development of nuclear weapons and their further proliferation, and to contribute, along with other concurrent efforts to reduce nuclear arms, to the eventual elimination of nuclear weapons".

2 Despite overwhelming endorsement in the United Nations of the call for the early achievement of a CTB, there has been little substantive progress towards this goal. New Zealand and Australia share the sense of frustration felt by many countries that the major achievements of recent years in disarmament and arms control have not been matched by comparable progress on a nuclear test ban. The two countries saw the Partial Test Ban Treaty Amendment Conference as a good opportunity to discuss in depth ways of furthering the objective of a CTBT, particularly on the important issue of verification. This paper was originally submitted jointly to the Conference as a positive and constructive contribution to its discussions.

3 The achievement of an effective CTBT is of course a global concern, and the need for verification clearly is not confined to the existing nuclear weapons states. New Zealand and Australia firmly believe that a CTBT has an essential role in preventing the horizontal and vertical proliferation of nuclear weapons. The achievement of a verifiable nuclear test ban would considerably strengthen the non-proliferation regime based on the NPT, IAEA safeguards and nuclear free zones.

Verification Requirements

4 One fundamental argument that has been put forward against a CTBT is that a nuclear test ban would not be verifiable. The Governments of Australia and New Zealand do not accept this view. Substantial scientific evidence is now available establishing the feasibility of verifying a nuclear test ban, particularly through seismic monitoring. It is technically possible to detect underground nuclear tests with a high degree of confidence down to very low levels.

5 In the view of New Zealand and Australia the development of an effective verification mechanism is an important part of the process of creating an effective, widely supported, and verifiable CTBT. Effective verification is however only part of the whole process which will need to involve a political will on the part of a number of key players before it can be achieved. In the meantime we see great value in taking as far as we can the development of an effective verification mechanism.

Seismic Verification Techniques

6 The two countries consider that the work carried out within the Conference on Disarmament by the ad hoc Group of Scientific Experts (GSE) is of fundamental importance in demonstrating that technical means exist for the verification of a CTBT.

7 The first report of the ad hoc group in 1978 (CCD/558) presented the results of a study of the detection ability of a hypothetical global network (Network III (SRO)) of digital broad-band seismographs located at then existing seismograph stations. It was estimated that this network (of at least two sections) would have a 90 per cent chance of detecting an event of magnitude 3.8 to 4.2 (or greater) in the northern hemisphere and magnitude 4.0 to 4.6 (or greater) in the southern hemisphere. Magnitude 4.0 corresponds to an explosion of less than ten kilotons in most geological environments and much less than this level in some environments.

8 The third report of the group (CD/448) in 1984 pointed to significant developments in seismic instrumentation, including the installation of more seismic arrays. Since that date, there have been still greater improvements, particularly in response to the initiatives of the ad hoc group. While further study is needed to evaluate accurately the capability of the present global network, it is clearly very close to that projected in 1978, and may well be significantly better.

GSETT-2

9 New Zealand and Australia both strongly support, and are participating in, the second technical test on the global exchange and analysis of seismic data being conducted by the group (GSETT-2). Phase 3 of this test involving world wide data exchanges for a period of 42 consecutive days has just concluded. The two countries have contributed data from monitoring stations in Australia and New Zealand, and also from stations as far apart as the Cook Islands and Antarctica. All together, this seismic monitoring system covers a major part of the southern hemisphere, and represents an essential component in the global scope of the experiment.

10 Detailed evaluation of the test, which will take place in Phase 4 and be presented in the group's report, will be needed to assess the extent to which global seismicity has been monitored. However, it is already clear that from an operational point of view the test has been very successful. Modern communications systems have provided efficient means of data transmission from stations to international centres. At these centres, large computing facilities accomplished the huge task of assembling the mass of data pouring in from the network, and daily bulletins incorporating such data have generally been available within seven days. Requests from individual states for data to assist their national verification studies were responded to promptly by the centres. It is clear that the global system established for GSETT could well provide the basis for an effective system under a comprehensive test ban treaty.

11 Both New Zealand and Australia have recently upgraded their seismic monitoring and data transmission equipment as a further part of their contribution to GSETT-2. Australia acted as one of the four international data centres for this experiment. The seismic arrays operated by Australia have the facility for enhancing weak signals by data processing techniques, which makes a major contribution to the global network's detection ability, particularly in the southern hemisphere.

12 The two countries were well placed to contribute to the experiment because of their extensive experience in using seismic detection to monitor nuclear tests. Both New Zealand and Australia have for many years been closely monitoring France's nuclear testing programme at Mururoa Atoll in the South Pacific. Scientists in New Zealand and Australia have accordingly developed considerable practical expertise in the seismic monitoring of underground nuclear tests of varying magnitude.

13 New Zealand's monitoring of explosions in French Polynesia, using a seismograph station in the Cook Islands, has demonstrated the particular sensitivity of such stations to tests in oceanic areas. This would be an important factor in a global monitoring network.

14 Based on this collective experience, it is the considered view of the Australian and New Zealand Governments that seismic monitoring offers a reliable means of verifying a CTBT. The successful conclusion of GSETT-2 will further strengthen confidence in the effectiveness of a global seismic monitoring and data transmission system down to a very low level.

Evasion

15 The possibility of evasion has been put forward as a reason to doubt that a CTBT could be adequately monitored. Various technical scenarios have been put forward for ways in which countries might evade detection, primarily through 'decoupled' explosions in underground cavities. However, the technology to attempt such evasion is unlikely to be available outside the existing nuclear weapons states, and the risk of detection would be extremely high and would increase with each test.

16 With in-country networks of seismographs to enhance the detection capability of the global network, it is likely that even the most elaborate precautions would not prevent the detection of explosions at levels as low as 1 kiloton. Attempts to evade a nuclear test ban would therefore be confined to a level at which the military advantages to be gained from clandestine explosions would be minimal and the chances of escaping detection would be extremely low.

Other Verification Techniques

17 While seismic detection would be a vital factor in the monitoring of a CTBT, verification need not depend on this alone. A network for monitoring airborne radiation, as proposed by Sweden, would provide valuable collateral support to a global seismic monitoring network. Satellite surveillance data would also help confirm international adherence to a CTBT.

18 A recent development has been the increased acceptance of on-site verification in other areas of arms control, following the precedent first established by the

INF Treaty. This could also be extended to verification of a nuclear test ban. The ratification of the protocols to the Threshold Test Ban Treaty and the Peaceful Nuclear Explosions Treaty has now set a further example for cooperation on verification procedures.

19 On-site verification, which is already widely accepted as an important component of arms control agreements, might also provide further assurance of compliance with a CTBT. The international disarmament process has advanced dramatically since the seismic monitoring network was first proposed, when national technical means were considered the only effective means of verifying compliance. Cooperation on measures for on-site verification, such as the placement of seismometers at possible test sites, would strongly reinforce a teleseismic verification system.

Wider Participation in Seismic Cooperation

20 In order to develop a global seismic monitoring capability down to a very low level it will be necessary to improve the coverage of seismic stations in Africa, South America and Antarctica. The involvement is therefore necessary of a wider group than is currently involved in the group of scientific experts (GSE) in the Conference on Disarmament.

Conclusions

21 In summary, New Zealand and Australia consider that there already exists compelling scientific evidence that a nuclear test ban is verifiable using technology currently available. The ongoing work of the Group of Scientific Experts is providing substantial technical corroboration for that view. The argument advanced by some nuclear testing states, that a nuclear test ban is not possible because it could not be verified, has consequently become increasingly difficult to sustain.

22 New Zealand and Australia consider that considerable progress has already been made towards the development of an adequate mechanism to verify a nuclear test ban. The ongoing work of the Group of Scientific Experts is important in this respect and it needs to continue its work with the benefit of a wider membership.

23 New Zealand and Australia welcomed the constructive discussion of verification issues at the Partial Test Ban Treaty Amendment Conference. The two countries had suggested that a significant achievement for the conference would be to:

- recognise the progress made towards a fully effective international verification system;

- endorse the efforts of the Group of Scientific Experts to demonstrate the technical feasibility of such a regime;

- call on more states to participate in the GSE to improve in particular coverage of seismic stations in Africa, South America, and Antarctica.

The widespread support for these general principles was encouraging. New Zealand and Australia believe that as a result of the discussions in New York there is greater international commitment to the important work on verification being carried out by the Group of Scientific Experts under the auspices of the Conference on Disarmament.